East Face Existing Conditions

Wildlife Species

MANAGEMENT INDICATOR SPECIES (MIS)

The Wallowa-Whitman National Forest Land and Resource Management Plan (LRMP) identifies five wildlife species, or groups of species, as MIS, or Management Indicator Species (U.S. Forest Service, 1990). These species are identified because of their special habitat needs that may be influenced significantly by planned management activities, and as a result their populations can be used to indicate the health of a specific type of habitat. MIS species welfare can be used as an indicator of other species dependent upon similar habitat conditions.

Table 1. Wallowa-Whitman National Forest Management Indicator Species

Management Indicator Species	Habitat	Presence Within Analysis Area
Rocky mountain elk	Cover and forage	Yes
American marten	Old growth and mature forest	Yes
Northern goshawk	Old growth and mature forest	Yes
Pileated woodpecker	Old growth and mature forest	Yes
Primary cavity excavators*	Snags and logs	Yes

* Northern flicker; black-backed, downy, hairy, Lewis', three-toed, and white-headed woodpeckers; red-naped and Williamson's sapsuckers; black-capped, and mountain chickadees; and pygmy, red-breasted, and white-breasted nuthatches

ROCKY MOUNTAIN ELK

Rocky Mountain elk have been selected as an indicator of habitat diversity, interspersion of cover and forage area, and security habitat provided by areas of low human disturbance. Elk management on the Wallowa-Whitman National Forest is a cooperative effort between the Forest Service and the Oregon Department of Fish and Wildlife (ODFW). The Forest Service manages habitat while ODFW manages populations by setting seasons, harvest limits, and goals for individual Wildlife Management Units (WMU). The Limber Jim/Muir project lies within the Catherine Creek WMU.

Potential elk habitat effectiveness may be evaluated using the Habitat Effectiveness Index (HEI; Thomas et al. 1988). This model considers the density of open roads, the availability of cover habitat, the distribution and juxtaposition of cover and forage across the landscape, and forage quantity and quality. More recently, Rowland et al. (2005) has proposed the use of distance band analysis (DBA) to better understand the effects of roads on elk security habitat.

BACKGROUND INFORMATION- Rocky Moutain elk (*Cervus canadensis nelson*- hereafter elk) are an important big game species in northeastern Oregon (Csuti et al. 2001) and are an indicator of the quality and diversity of forested habitat (defined as $\geq$ 40% canopy closure, USDA LRMP 1990) which includes an interspersion of cover and forage areas, and security habitat provided by cover and low levels of human activity (Thomas 1979). It is commonly accepted that the other big game species (i.e. mule deer, white-tailed deer, black bear, and cougar) are at least partially accommodated when high quality elk habitat is present. Elk are habitat generalists; they exploit a variety of habitat types in all successional stages and their patterns of use change daily and

seasonally (Toweill and Thomas 2002). Optimal calving habitat is gentle terrain with plenty of succulent vegetation less than 1,000 ft from water, with an abundance of low shrubs or small trees under an overstory with a $\geq$ 50% canopy closure (Thomas 1979). Elk are quite responsive to land management activities, thus the density or health of elk populations (as opposed to examining population trends) most likely indicate the effectiveness of elk management. (Toweill and Thomas 2002).

Logging generally results in increased elk forage, with declines in the short term (1-3 years), followed by large increases in forage that may last 10 years or longer (Wisdom et al. 2005b). Large-scale habitat manipulations are being conducted with increased frequency in western forests, and although fuels reduction via thinning or prescribed burning often is assumed to benefit wildlife (Toweill and Thomas 2002, Wisdom et al. 2005a), based on the interacting effects of fuels reduction and season on forage characteristics, Long et al. (2008) suggests that maintaining a "mosaic of burned and unburned forest habitat may provide better long-term foraging opportunities for elk than burning a large proportion of the stand on a landscape."

Displacement of elk from areas during human activities (e.g. logging, fuels reduction) is well documented (Edge 1982, Toweill and Thomas 2002, Wisdom et al. 2005a). Under most cases, this displacement is temporary, and there is no evidence that elk will not eventually return to harvested areas (Toweill and Thomas 2002). Of much more concern to resource managers are the establishment of roads associated with harvest activities that increase accessibility to recreationists (e.g. hunter, hikers, cross country skiers, OHV). Increased road use by recreationists has been shown to significantly reduce elk security (Towill and Thomas 2002), increase stress levels (Creel et al. 2002), and increase elk vulnerability to mortality from both legal and illegal hunter harvest (Rowland et al. 2005).

BLUE MOUNTAIN/WWNF POPULATION VIABILITY- The National Forest Management Act (1976) requires that habitat exist to provide for viable populations of all native and desires non-native vertebrates. Elk is a game species that is managed on a management objective (M.O.) basis. Management objectives were developed to consider not only the carrying capacity of the lands, but also the elk population size that would provide for all huntable surplus, and tolerance levels of ranchers, farmers, and other interests that may sometimes compete with elk for forage and space. Biologically, a population that is managed around a M.O. is much larger than a minimum viable population. A minimal viable population represents the smallest population size that can persist over the long term. Historically there were game species, including elk, which warranted serious conservation concerns due to depressed populations and range contractions resulting from unregulated market and sport hunting and loss of habitat. Many of the factors that contributed to the decline of large wild ungulates in the past do not exist today. Currently, elk populations on the WWNF are regulated by hunting and predation. Elk numbers are substantially higher than what would constitute a concern over species viability.

LRMP STANDARDS AND GUIDELINES- The FS land management allocations MA1, MA1 W, MA3, and MA3A emphasize timber production, but timber management is designed to provide near-optimum cover and forage conditions for big game. The LRMP gives big game standards by MA for cover, open road density, and habitat effectiveness (HEI) (Table 2)

Table 2. Standards for big game habitat by MA 9U.S. Forest Service 1990)

Habitat measure	MA 1	MA 1W	MA 3 (Winter Range)	MA 3W (Summer Range)
Cover[1]	≥ 30% cover	≥30% cover	No numerical standard in the LRMP, but it states "…to provide near-optimum cover and forage conditions for big game"[2]	No numerical standard in the LRMP, but it states "…to provide near-optimum cover and forage conditions for big game"[2]
HEI value	≥0.5	≥0.5	Long-term average of 0.74	Long-term average of 0.74
Open road density	≤ 2.5 mi/mi^2	≤1.5 mi/mi^2	≤1.5 mi/mi^2	≤1.5 mi/mi^2
Distribution of cover	N/A	N/A	At least 80% of the treated area that converts cover to forage is to be within 600 ft of a satisfactory cover patch at least 40 acres in size	At least 80% of the treated area is 1) w/in 600 feet of a satisfactory or marginal cover patch at least 6 acres in size and 2) w/in 900 feet of a satisfactory cover patch at least 40 acres in size

[1]Cover refers to any combination of satisfactory cover (a stand of coniferous trees with >70% canopy closure) and marginal cover (a stand of coniferous trees with 40-70% canopy closure). The optimum elk habitat ratio is approximately 40% cover to 60% forage (Thomas 1979)
[2]A ratio of 40% of a landscape in cover to 60% in forage approximates optimum habitat in the Blue Mountains (Thomas 1979). A "near-optimum" ratio would resemble the ≥ 30% cover standard for MA1 and 1W.

EXISTING CONDITION- The East Face project area falls within the Starkey WMU (ODFW) contained within the Umatilla-Whitman Province. Elk populations in the province increased from about 7,500 in the late 1960's to about 19,000 in the mid-1970's. Populations have remained between 15,000 and 20,000 ever since. The Starkey unit has remained fairly stable over the years. In 2001, elk numbers were about 116% of the management objective of 17,100.

The Forest Plan establishes standards for wildlife habitat, and more specifically elk habitat on the Forest. The East Face analysis area provides year round habitat for big game, though winter range and summer range are minimal; 996 acres of MA-3 (wildlife/timber emphasis- big game winter range) lies along the eastern/center edge of the analysis area. 35,051 acres is designated MA-1 (Intensive timber management) and covers the majority of the project area. 3,687 acres is designated MA-3A (wildlife/timber emphasis- big game summer range) and lies along the eastern portion of the analysis area. High security habitat is provided within the north eastern and south eastern/central portions of the analysis area due to limited motorized access and seasonal closures.

The East Face project area was analyzed using a habitat effectiveness model (Thomas et al. 1988) to assess the quality of elk habitat. The HEI model evaluates size and spacing of cover and forage areas, density of open roads, quantity and quality of forage available to elk and cover quality. Forage data is unavailable and is not included in the total HEI value. To further examine security habitat for elk, a distance band analysis (DBA) was performed as described by Rowland et al. (2005), and a separate HEI value was calculated (Table 3). DBA calculates the percent of the analysis area from varying distances from open motorized routes. HEI was analyzed at the project level, which is approximately 47,600 acres.

Cover: Forage Ratio – A cover: forage ratio is used to describe the relative amounts of cover to forage and while the optimal ratio of cover to forage is 40:60 (Thomas 1979), the LRMP establishes a minimum standard that at least 30% of forested land be maintained as cover (>40% canopy closure). "Forested land" refers to only those acres that currently provide forested cover or have the potential to provide it, not to grassland, shrub steppe, rock, or bodies of water. Cover refers to any combination of satisfactory cover (a stand of coniferous trees with >70% canopy closure) and marginal cover (a stand of coniferous trees with 40-70% canopy closure). Forage habitat has less than 40% canopy cover.

The existing cover: forage ratio is 71:29. This ratio exceeds the LRMP standard, suggesting a high surplus of cover, however stand data was collected in the early 80's and the ratio may misrepresent the analysis area based on changed conditions due to natural disturbances over time.

Cover Quality – Forests stands with relatively closed canopies function as thermal and security cover, providing a visual barrier from predators, and may reduce the effects of ambient temperature, wind, and long and short wave radiation functions on energy expenditure (i.e. increased metabolic rates) in elk. Although the benefits to elk of "thermal cover", in the true sense of the word, has been questioned (Cook et al. 1998, Bender and Cook 2005), the intent of the standard in managing elk habitat remains credible in that habitat attributes can be influential to energy balances by affecting forage quality and quantity, and mediating energy expenditures associated with travel and harassment (Bender and Cook 2005). By implementing the current "thermal cover" standard, resource managers are also providing needed barriers to minimize the negative effects of human disturbance.

The Wallowa-Whitman LRMP establishes a minimum standard for big game thermal cover (marginal and satisfactory combines). At least 30% of the forested lands should be maintained in a thermal cover condition. All Management Areas were pooled for analysis, because they have the same cover standard, thus providing for a more landscape-scale based approach. There are currently 5,685 acres (12.8%) of satisfactory cover, 26,689 acres (58%) of marginal cover and 13,282 acres (29%) of forage habitat within the analysis area resulting in a cover quality value of 0.59 (Table 3).

Size and Spacing – Thomas et al. (1979) suggest that size and spacing of cover and forage habitat is a key to elk use of forested habitat, and this assumption was verified by Leckenby (1984) in the Blue Mountains of northeastern Oregon. Size and spacing of habitat is considered optimal when cover to forage edge widths are between 100-200 yards (Thomas et al. 1988). Considering an HE value of 1 is optimal, an HE size and spacing value of 0.53 (Table 3) indicates that forage to cover ratios within the analysis area is less than optimal, but acceptable. However, this variable is not meant to stand alone and therefore management decisions for providing optimum elk habitat solely based on HE size and spacing value should be used with caution.

Open Roads – Excessive open road densities have deleterious effects on habitat effectiveness by taking land out of production (1 road mile equals 4 acres of land), reducing the effectiveness of cover and increasing disturbance to elk. The existing average open road density within the East Facer analysis area is 1.74 mi/mi^2 (Table 3). 74% of the East Face planning area is designated

MA-1 and the average open road density is lower than the forest plan guideline of 2.5mi/mi^2 for MA-1. However, the road density estimate does not take into account off-road vehicle use on OHV trails, cross-country travel and on closed roads. When these variables are taken into account, road density estimates are likely to be higher.

An important finding from the Starkey Experimental Forest and Range studies is that road (or route) density is not the best predictor of habitat effectiveness for elk. Instead, a method using distance bands proved to be a more useful tool for assessing effects from roads. Road densities do not provide a spatial depiction of how roads are distributed on the landscape (Rowland 2005), but a distance band analysis does. A distance band analysis uses GIS to draw concentric bands around motor vehicle routes until the entire area of interest (in this case the Limber Jim/Muir analysis area) is occupied by these bands. The distance band closest to motor vehicle routes (within one half mile) provides the least security for elk. As a result, elk choose to spend less time within one half mile of motor vehicle routes. As distance from motor vehicle routes increases, so does habitat effectiveness for elk. Elk find more security from human disturbance further from motor vehicle routes. The second distance band occupies the area between on-half and one mile from motor vehicle routes, and represents moderate quality security habitat for elk. Effects from motor vehicles begin to dissipate within the second distance band. Finally, effects from roads are nearly negligible within the third distance band that occupies the area greater than one mile from motor vehicle routes. The third distance band represents high to optimal quality security habitat for elk. For this analysis, the percentage of the landscape within each distance band was used as a means of comparing alternatives with regard to the effects of motor vehicle disturbance to elk.

Habitat Effectiveness Index – The Habitat Effectiveness Index (HEI) values are based on a comprehensive elk habitat model developed by Thomas et al. (1988). These values consider the interaction of size and spacing of cover and forage areas, density of roads open to vehicular traffic, forage quantity and quality, and the quality of cover. For this report, HEI values were calculated without a forage quality value because accurate forage data is not available. Roads often compromise the effectiveness of cover. Excessive open road densities have deleterious effects on habitat effectiveness by reducing the quality of security cover and increasing disturbance. These negative impacts change elk distribution and behavior. The impacts of OHV's on closed roads and cross country travel are not considered in an HEI analysis, although they likely cause some further reduction in habitat effectiveness. The existing values are 0.58 (road density analysis) and 0.60 (distance band analysis; Table 3).

Table 3. Habitat-effectiveness index calculations for elk habitat within the Limber Jim/Muir analysis area

Habitat Effectiveness Variable	Habitat Effectiveness Value (Optimal = 1.0)	Comments
HE Cover	0.59	Amount of satisfactory cover relative to marginal cover
HE Size and Spacing	0.53	Mosaic of cover and forage, 64:36

Habitat Effectiveness Variable	Habitat Effectiveness Value (Optimal = 1.0)	Comments
HE r value using road density	0.51	Open road density 0.93 mi/mi sq LRMP MA-1 $\leq$ 2.5 mi/mi sq LRMP MA-3/3A $\leq$ 1.5 mi/mi sq
HE r value using distance bands	0.45	Concentric bands around open roads
Total HEI using road density[1]	0.58	LRMP MA-1 $\geq$ 0.5 HEI
Total HEI using distance band analysis*	0.60	LRMP MA-1 $\geq$ 0.5 HEI
Percent of area $\geq$ 0.90 mi from open motorized route*	6%	High quality security habitat

[1] HEI calculations do not include a forage variable because current, reliable forage data are not available

[*] Habitat $\leq$ 0.90 mi from an open motorized route is considered marginal or poor

OLD GROWTH HABITAT: AMERICAN MARTEN, NORTHERN GOSHAWK, AND PILEATED WOODPECKER

The American marten, northern goshawk, and pileated woodpecker are MIS of old growth habitat (U.S. Forest Service 1990). Old-growth habitat is categorized and analyzed in 2 categories according to the LRMP: 1) late old-growth structure; and 2) MA 15 – Old-Growth Preservation. MA-15 is a land allocation under the LRMP (U.S. Forest Service 1990) intended to provide quality habitat for wildlife species associated with old growth characteristics. Old growth is a structural classification used to implement direction in the Forest Plan Amendment #2 (Screens; U.S. Forest Service 1995) and refers to multi-strata stands with large trees (Old Forest Multi-Stratum- OFMS) and single-stratum stands with large trees (Old Forest Single Strata- OFSS). Although the two terms have different administrative implications, both are intended to provide habitat for old growth associated wildlife species.

OLD GROWTH HABITAT

Background information-Declines in single stratum large trees structure (late-seral ponderosa pine) has been well documented (Wisdom et al. 2000, Squires et al. 2006), while mid-seral shade-tolerant forests seem to be at nearly twice their historical levels. These changes benefit some species but negatively affect others. The winter wren, Swainson's thrushes, pileated woodpeckers and American marten favor dense, multi-storied forests. These species are rarely associated with open ponderosa pine and open mixed-conifer types, which historically were widespread in many dry landscapes. Other wildlife species, however, such as the white-headed woodpecker and flammulated owl are associated with open, old-growth ponderosa pine

(Sallabanks et al. 2001) and their populations have possibly declined as result of the loss of this forest type (Csuti et al. 1997, Wisdom et al. 2000).

Thinning reduces competition-induced- mortality in a stand, and can likely enhance habitat for species associated with late seral conditions, particularly if critical structural components, such as dead wood, are provided and if stands are managed to provide vertical and horizontal heterogeneity. Effects of thinning on a given species of wildlife may vary across a range of temporal and spatial scales. For example, large tree crowns may ultimately improve habitat for some small mammals and some species of birds to nest and forage, but increased spacing between crowns may temporarily decrease habitat suitability and inhibit dispersal. Hayes et al. (1997) states that knowledge of many species is inadequate to predict responses at multiple time frames, but it is important to consider short- and long-term as well as stand- and landscape-level perspectives when evaluating the implications of thinning.

Regional Forester Amendment #2 of June 12, 1995 established interim riparian, ecosystem, and wildlife standards for timber sales (these standards are referred to as the "Eastside Screens"). The Eastside Screens require that a range of variation approach be used when comparing historical reference and current conditions, incorporating the best available science. The range of variation approach assumes that native species have evolved with the historical disturbance regimes of an area and so a forest will continue to sustain populations of those species if current conditions fall within the historic range of variation (Powell 2010). The following range of variation analysis uses methods described in Range of Variation Recommendations for Dry, Moist and Cold Forests (Powell 2010), which is now considered the best available science. Five forest structural stages are identified within these three potential vegetation groups; Stand Initiation (SI), Stem Exclusion (SE), Understory Retention (UR) and Old Forest Single Stratum (OFSS) and Old Forest Multi Strata (OFMS).

LRMP standards and guidelines- The Regional Forester's Eastside Forest Plan Amendment #2 (SCREENS) contains standards and guidelines for old growth (U.S. Forest Service 1995). Standards and guidelines include maintaining all existing remnant late and old seral and/or structural live trees >21" dbh. According to the LRMP, areas allocated to MA15 have no scheduled timber harvest although salvage may occur following catastrophic destruction if more suitable replacement stands exist.

EXISTING CONDITIONS

MA-15 Old Growth Preservation- There are 2,906 acres of MA-15 allocated land in the analysis area. Suitable old growth habitat generally contains large diameter live trees, large snags and down wood; old forest multi story (OFMS) provides old growth habitat along with understory re-initiation (UR), though UR typically lacks the density of large structure.

Late Old-Growth Structure- Analysis was conducted at the project level totaling 47,636 acres. Approximately 12% (2,277 acres) of the moist upland potential vegetation group within the analysis area is in an old forest multi-story (OFMS) structural stage, which is below the historical range of 15-20%. There are 929 acres (10%) of OFMS in the dry upland, which falls within the historical range of 5-15%. There are 692,574 acres (16%) of OFMS in the cold upland, which is within the historical range of 10-25% (Table 6). Old forest single-story (OFSS) is deficient in all

potential vegetation groups (PVG) in which it historically occurred and is 10-20% below HRV in the moist upland PVG and 40-60% below HRV in the dry upland PVG (Table 6).

Connectivity- According to the SCREENS Forest Plan Amendment (U.S. Forest Service 1995), connectivity corridors do not necessarily meet the same description of "suitable" habitat for breeding for old growth species, but allows free movement between suitable breeding habitats. Identifying these connective corridors ensures that blocks of habitat maintain a high degree of connectivity between them, and do not become fragmented in the short-term. Connective corridors between patches of old growth structures have been identified on a map that is on file at La Grande Ranger District. Naturally occurring old forest landscape connectivity is found between the Wolf Creek/Powder River, North Powder River and the Grande Ronde Beaver Creek Watershed, which lies to the west of the East Face project area. These connections are verified with marten location information gathered from a research project conducted by the Pacific Research Station in the Grande Ronde Beaver Creek watershed. Marten were documented moving across the project area within the identified connective areas, indicating functioning old growth habitat.

Table 4. Comparison of HRV to existing by potential vegetation group (PVG) in the East Face project area

PVG	Existing Acres	% of PVG	Historical Range %
Old Forest Multi Stratum (OFMS)			
moist upland	2,277	12%	15-20%
dry upland	929	10%	5-15%
cold upland	2,574	16%	10-25%
Old Forest Single Stratum (OFSS)			
moist upland	27	0%	10-20%
dry upland	257	3%	40-60%
cold upland	392	2%	5-20%

AMERICAN MARTEN (*MARTES AMERICANA*)

MANAGEMENT INDICATOR SPECIES – AMERICAN MARTEN

Background information- The American marten (*Martes americana*, - hereafter marten*)* is associated with mature, mesic coniferous forests and is one of the most habitat-specialized mammals in North America (Bull and Heater 2001). Martens require complex physical structure in the forest understory created by lower branches of trees, shrubs and coarse woody debris (Buskirk and Ruggiero 1994, Witmer et al. 1998, Bull and Heater 2000). Marten in northeastern Oregon have been documented using large-diameter hollow trees and logs, accumulations of coarse woody debris, and trees with brooms for denning and resting sites (Bull and Heater 2000). 70% of martens in eastside mixed conifer forests used snags > 23.9 in dbh for denning and

resting and downed wood > 20.7 in dbh for denning, resting and foraging (Mellen-Mclean et al. 2009).

Viability Determination- Wisdom et al. (2000) assessed broad-scale trends of 91 species in the interior Columbia Basin, including the marten. The historical estimate of source habitat for marten in the Blue Mountains was 8.83%, which increased to 23.5% by the 1990s. By managing habitat similar to historical conditions, it is assumed that remaining habitat will be adequate to ensure population viability because species survived those levels of habitat in the past to be present today (Landres et al. 1999).

Source habitat for marten was evaluated on the Wallowa-Whitman National Forest (Penninger and Keown 2011) and represents the highest quality habitat which contributes to species viability. Source habitat for American marten is considered to be cold-moist and cold-dry forests with multi-stories, large tree structure and closed canopies. The threshold of $\geq$ 40% of the historical amount of source habitat in a watershed was used to identify watersheds with a relatively high amount of source habitat. Watersheds that contain $\geq$ 40% of the estimated historical median amount of source habitat are believed to provide for habitat distribution and connectivity, and better contribute to species viability across the forest. Not all watersheds on the Wallowa-Whitman NF have the potential to provide source habitat for marten; historically 76% of the watersheds provided source habitat and currently 68% of the watersheds provide source habitat. Although the viability outcomes for the current condition are lower than the historical, habitat is estimated to currently exist in the quality, quantity, and distribution capable of supporting a viable marten population at the Wallowa-Whitman National Forest scale.

EXISTING CONDITIONS

Wolf Creek- Powder River Watershed – A portion of the East Face planning area lies within the Upper Wolf Creek subwatershed of the Wolf Creek-Powder River watershed (5^{th} HUC). This watershed contains 396 existing acres of marten source habitat (habitat that can support a stable or increasing population of marten) out of 9,335 (4%) potential acres of marten habitat. The current watershed index is 0.63 with the historic watershed index at 2.85, indicating a high historic level of habitat quality and a current low level of habitat quality and quantity. This watershed currently does not provide $\geq$ 40% of the median amount of source habitat that occurred historically, and is not above the threshold necessary to support marten population viability (Penninger and Keowen 2011). This does not preclude marten from using the area as secondary habitat (hunting and traveling) but indicates that the majority of the habitat is not suitable for denning.

North Powder River Watershed- The rest of the East Face planning area lies within the Anthony Creek and portions of the Antone Creek drainages in the North Powder River Watershed. This watershed contains 4,876 existing acres of marten source habitat out of 36,557 (13%) potential acres of marten habitat. The current watershed index is 2.49 with the historic watershed index at 2.82, indicating a high historic level of habitat quality and a current low level of habitat quality and quantity. This watershed provides $\geq$ 40% of the median amount of source habitat that occurred historically, and is above the threshold necessary to support marten population viability (Penninger and Keowen 2011). This area likely is used for hunting, traveling, and denning

East Face Project Area –Primary source habitat for marten is defined as habitat within moist and cold upland forests in the LOS stage with ≥ 60% canopy closure and ≥ 20" dbh as the tree size. According to a GIS query, the East Face project area contains 3,907 acres of primary habitat (8% of the project area). Marten research conducted by the Pacific Northwest Research Station performed during the mid 1990's in the adjacent Grande Ronde River-Beaver creek watershed gives a picture of marten activity within parts of the East Face project area. Tagged marten were shown moving between watersheds, primarily using habitat in the upper west corner of the project area and moving down the north facing drainages of Clark creek and Wolf creek. These drainages contain the majority of the moist OFMS found within the upper north portion of the projet area. Remote sensing cameras were utilized in the summer of 2014 in areas identified as marten habitat. Marten were detected on the upper western boundary of the project, in the same area the 1990's research found marten. This verification gives weight to the assumption that marten are moving and using their habitat in a similar manner as during the time of the research study. Marten have also been picked up on remote cameras at the southern edge of the project area in the vicinity of the Anthony Lakes ski area.

MANAGEMENT INDICATOR SPECIES – NORTHERN GOSHAWK

Background information- The Northern goshawk (*Accipiter gentilis*, - hereafter goshawk) was chosen as a supporting indicator of abundance and distribution of mature and old-growth forests. The goshawk is associated with dense canopied mixed conifer, white fir, and lodgepole pine associations (Wisdom et al. 2000). Important habitat attributes of goshawk prey species include snags, down logs, woody debris, large trees, openings, herbaceous and shrubby understories, and an intermixture of various forest structural stages (Wisdom et al. 2000). Goshawks are prey generalists and use open understories below the forest canopy and along small forest opening to forage for mammals and small birds (Bull and Hohman 1994, Marshall 1992, Squires 2000).

Goshawks use broad landscapes that incorporate multiple spatial scales to meet their life requisites (Squires and Kennedy 2006). At least three levels of habitat scale are recognized during the breeding season: (1) a nest area, composed of one or more forest stands or alternate nests; (2) a post fledging area (PFA), which is an area around the nest used by adults and young from the time of fledging, when the young are still dependent on the adults for food, to independence; (3) a foraging area that comprises the breeding pairs entire home range (Reynolds et al. 1992, Reynolds 1983).

The nest area, or nest site, is the area immediately surrounding the nest tree, including the forest stand containing the nest tree. In general, goshawk nest areas are unique in structure, with large trees, dense and multiple canopies, and high canopy closure (>50%) primarily within mature and older forests with high amounts of down wood and snags (Finn 1994, McGrath et al. 2003).

The Post Fledging Area (PFA) surrounds the nest area and is defined as the area used by the family group from the time the young fledge until they are no longer dependent on the adults for food (up to two months) (Reynolds et al. 1992, Kennedy et al. 1994). PFAs generally have patches of dense trees, developed herbaceous and/or shrubby understories and habitat attributes (snags, down logs, small openings) that are critical for goshawk prey (Reynolds et al. 1992). The PFA is potentially important to the persistence of goshawk populations, as it may correspond to

the area defended by the breeding pair and provides fledgling hiding cover and foraging opportunities as fledglings learn to hunt.

Viability Determination- Throughout the Interior Columbia Bain, the amount of source habitat (i.e., habitat requirements to provide long term population persistence) available to the goshawk has declined from historical conditions. The greatest declines have occurred in the interior ponderosa pine and western larch forest types. It is estimated that there has been a 96% decline in old forest single-story ponderosa pine (Wisdom et al. 2000). However the interior Douglas fir, grand fir, white fir, lodgepole pine, and juniper sagebrush have all increased in abundance from historical conditions. The overall decline in source habitat and strong decline in the ponderosa pine cover type is offset somewhat by increases in these other cover types and structural stages that provide source habitat.

Additional source habitat analysis was conducted at a finer scale on National Forest lands as part of a species viability assessment conducted by Wales (2011) in support of the Blue Mountains Forest Plan revision (Penninger and Keown 2011). The threshold of $\geq$ 40% of the historical amount of source habitat in a watershed was used to identify watersheds with a relatively high amount of source habitat. Watersheds that contain $\geq$ 40% of the estimated historical median amount of source habitat are believed to provide for habitat distribution and connectivity, and better contribute to species viability across the forest. Thirty-two of the thirty-five watersheds on the Wallowa-Whitman National Forest which historically provided source habitat are above the historical median of source habitat providing 440,696 acres (94% of historical condition) of goshawk habitat. While the presence of roads and trails has decreased the habitat effectiveness of source habitat in most watersheds (67% in the low habitat effectiveness class) the majority of watersheds (86%) on the WWNF have high watershed index scores. High watershed index scores indicate good habitat abundance with low departure from historical conditions, and high habitat quality, with greater 50% of the source habitat being late-successional habitat.

The current viability outcome index for the WWNF show that current source habitat for the goshawk is slightly lower than for the entire Blue Mountains but is very near historical conditions, indicating that suitable habitats are broadly distributed and of high abundance, and the goshawk is likely well-distributed throughout the WWNF (Penninger and Keown 2011).

LRMP Standards and guidelines- The Regional Forester's Eastside Forest Plan Amendment #2 (SCREENS) requires that all known and historically used goshawk nest-sites be protected from disturbance. An active nest is defined as a nest that has been used by goshawks within the past five years. SCREENS requires that a 30-acre nest of the most suitable nesting habitat be established around every known active and historical nest tree(s) and that it be deferred from harvest, and that a 400-acre post fledging area be established around every known active nest site, While harvest activities can occur within the PFA, up to 60% of the area should be retained in LOS conditions and harvest is to promote the development of LOS. Management of the PFA is intended to provide a diversity of forest conditions. Thinning from below with irregular spacing of leave trees would maintain the appropriate stand composition and structure. A seasonal restriction on logging in the PFA would be implemented during the nesting season from March 1 – September 30.

EXISTING CONDITIONS

Wolf Creek/Powder River - The northern portion of the East Face project area lies within the Wolf Creek/Powder River watershed (5th HUC). This watershed contains 2,289 acres of existing goshawk source habitat (habitat that can support a stable or increasing population of northern goshawks) out of 13,226 acres (17%) of potential habitat. The current watershed index is 2.30 and the historical watershed index is 2.94, indicating a high level of habitat quality and quantity both currently and historically. The weighted watershed index is 2,132 indicating that this watershed provides a low contribution to goshawk population viability on the forest. This watershed currently provides ≥ 40% of the median amount of source habitat that occurred historically, which is above the threshold necessary to support goshawk population viability (Penninger and Keown 2011).

North Powder River- The southern portion of the East Face project area lies within the North Powder River watershed (5th HUC). This watershed contains 9,361 acres of existing goshawk source habitat (habitat that can support a stable or increasing population of northern goshawks) out of 41,811 acres (22%) of potential habitat. The current watershed index is 2.84 and the historical watershed index is 2.94, indicating a high level of habitat quality and quantity both currently and historically. The weighted watershed index is 10,759, indicating that this watershed provides a medium contribution to goshawk population viability on the forest. This watershed currently provides ≥ 40% of the median amount of source habitat that occurred historically, which is above the threshold necessary to support goshawk population viability (Penninger and Keown 2011).

East Face project area – Northern goshawk source habitat was assessed for the East Face analysis area using four variables; potential vegetation group, canopy closure, number of canopy layers and tree size, as defined in the Northern Goshawk Management Indicator Species Assessment (Peninger and Keown 2011). Potential vegetation groups include dry ponderosa pine, dry Douglas-fir, dry grand fir, cool moist and cold dry. Canopy closure is generally greater than 40% in the dry vegetation types and greater than 60% in the cool and cold types. Canopy layers included both single and multi-story and tree size is defined as 15 in dbh or greater. A GIS query found 4,958 acres of primary northern goshawk habitat (10% of the project area). Audio callback transects were conducted June-August 2014 in identified goshawk source habitat. Goshawks were detected in the northern part of the project area. Additional surveys will be conducted during the nesting season of 2015 and when a nest tree is identified, the proper treatment restrictions will be enforced (30 acres no treatment zone around nest tree).

MANAGEMENT INDICATOR SPECIES – PILEATED WOODPECKER

Background Information- The pileated woodpecker (*Dryocopus pileatus*) occurs primarily in dense mixed-conifer forest in late seral stages or in deciduous tree stands in valley bottoms. It is occasionally seen in younger stands lacking large diameter trees, particularly in winter. It is rarely found in stands of pure ponderosa pine. The association with late seral stages stems from the need for large diameter snags or living trees with decay for nest and roost sites, large diameter trees and logs for foraging on ants and other arthropods, and a dense canopy to provide cover from predators (Marshall et al. 2003).

In northeast Oregon, the pileated woodpecker shows high selection for mature, unlogged grand fir stands with ≥ 60% canopy closure, multiple canopy layers, and high snag density (Bull and Meslow 1988, Bull 1987, Bull and Holthausen 1993). Bull et al. (2007) found that densities of nesting pairs of pileated woodpeckers were positively associated with the amount of late structural stage forest and negatively associated with the amount of area dominated by ponderosa pine and the amount of area with regeneration harvest. Although there is a preference for dense canopy stands, high tree mortality and loss of canopy closure in stands of grand fir and Douglas fir did not appear to be detrimental to pileated woodpecker provided that large dead or live trees and logs were abundant and that stands were not subject to extensive harvest. Pileated woodpecker densities remained steady over 30 years in areas where canopy cover dropped below 60% due to tree mortality; older stands of grand fir and Douglas fir consisting primarily of snags continued to function as nesting, roosting and foraging habitat for pileated woodpeckers. While closed canopy forests were not essential for use by pileated woodpeckers, nest success was higher in home ranges that had greater amounts of forested habitat with ≥ 60% canopy closure (Bull et al. 2007).

Pileated woodpeckers feed primarily on insects in dead wood in snags, logs, and naturally created stumps (Bull and Meslow 1988, Bull et al. 1986, Torgersen and Bull 1995). Based on research data compiled in the DecAID Wood Advisor (Mellen-Mclean et al. 2009) for eastside mixed confier forests, 70% of pileated woodpeckers in the populations studied used snags > 12.9 in. dbh for foraging. Stands with high density of snags and logs were preferred for foraging (Bull and Meslow 1977).

Viability Determination- Habitat trends of the pileated woodpecker were assessed at the Interior Columbia Basin, Blue Mountains ecological reporting unit (ERU), and WWNF scales using information provided by Wisdom et al. (2000) and the species viability assessment conducted by Wales (2011) in support of the Blue Mountains Forest Plan revision.

A fine-scale analysis of source habitat on National Forest lands in the Blue Mountains, including the WWNF was conducted in 2011 (Penninger and Keown 2011).This analysis indicated that there has been a decline in the amount of source habitat on the WWNF from historical conditions. However, source habitat of the pileated woodpecker is still available in adequate amounts and distribution to maintain pileated species viability on the WWNF. Currently, there are approximately 206,374 acres (57% of historical condition) of source habitat on the WWNF, with twenty-nine of the thirty-five watersheds (83%) on the WWNF that historically provided source habitat, continuing to provide that habitat. Reductions of snags and the presence of roads has decreased the quality of source habitat in many watersheds but 33% of the watersheds on the WWNF have high watershed index scores, indicating good habitat abundance, moderate to high snag densities and low to moderate road densities. Additionally, 29% of the watersheds are in the moderate category. Watersheds having ≥ 40% of the median amount of source habitat are distributed across the WWNF and found in all clusters.

The viability assessment indicates the WWNF still provides for the viability of the pileated woodpecker. The pileated woodpecker is distributed across the WWNF and there are adequate

amounts, quality, and distribution of habitat to provide for pileated woodpecker population viability.

EXISTING CONDITION

Wolf Creek- Powder River Watershed – The northern portion of the East Face planning area lies within the Upper Wolf Creek subwatershed of the Wolf Creek-Powder River watershed (5^{th} HUC). This watershed contains 833 acres of existing pileated source habitat (habitat that can support a stable or increasing population of pileated woodpeckers) out of 13,120 acres (6%) of potential source habitat. The current watershed index is 0.76 and the historic watershed index is 2.63 indicating a high level of habitat quality and quantity historically and a low level of habitat quality and quantity presently. The weighted watershed index is 257, indicating the watershed provides a low contribution to pileated woodpecker population viability on the forest. This watershed does not provide $\geq$ 40% of the median amount of source habitat that occurred historically. Based on the amount of existing source habitat, it is estimated that this watershed has the potential to support 1 breeding pair of pileated woodpeckers (Penninger and Keown 2011).

North Powder River Watershed- The southern portion of the East Face planning area lies within the Anthony Creek and portions of the Antone Creek drainages in the North Powder River Watershed. This watershed contains 5,976 acres of existing pileated source habitat (habitat than can support a stable or increasing population of pileated woodpeckers) out of 41,731 acres (14%) of potential source habitat. The current watershed index is 1.97 and the historic watershed index is 2.63 indicating a high level of habitat quality and quantity historically and a medium level of habitat quality and quantity presently. The weighted watershed index is 4,776, indicating the watershed provides a medium contribution to pileated woodpecker viability on the forest. This watershed provides $\geq$ 40% of the median amount of source habitat that occurred historically, which is above the threshold to support a stable population of pileated woodpeckers. Based on the amount of existing source habitat, it is estimated that his watershed has the potential to support 8 breeding pairs of pileated woodpeckers (Penninger nad Keown 2011).

East Face project area – Although pileated woodpeckers will use many habitat types, successful reproduction is thought to be tied to optimum habitat, which is typically Old Forest Multi Structure (OFMS). Pileated woodpecker source habitat was assessed for the East Face analysis area using four variables; potential vegetation group, canopy closure, number of canopy layers and tree size, as defined by Penninger and Keown (2011). Potential vegetation groups include dry Douglas fir, dry grand fir, cool moist and cold dry. Canopy closure is generally greater than 40% in the dry vegetation types and greater than 60% in the cool and cold types. Canopy layers included both single and multi-story and tree size is defined as 20 in dbh or greater. Source habitat for pileated woodpeckers within the East Face analysis area is approximately 2,506 acres, (5%) of the project area. The project area does not provide a large contribution to pileated population viability within the watershed. Surveys during the 2014 field season consistently found pileated sign in dry and moist OFMS and OFSS stands. Two pairs of pileated woodpeckers were identified and the nest tree will be protected.

LRMP standards and guidelines- The LRMP requires that a 300-acre pileated feeding area be established in proximity to any patch of MA15 $\geq$ 300 acres and that at least 2 snags > 10 in dbh/acre be maintained within the feeding area. The Regional Forester's Eastside Forest Plan Amendment #2 (SCREENS) requires the maintenance of snags and GTR trees >21 in dbh at 100% potential population levels; at least 2.25 snags/acre are needed after post-sale activities are completed to meet the 100% level. The SCREENS require a higher snag standard that the original LRMP. The SCREENS do a better job of providing pileated habitat than the original LRMP because all structural stages (including snags and down wood) are managed according to historical proportions (HRV analysis) across the entire landscape, not just in polygons designated "feeding areas" near MA15. The LRMP feeding areas were likely more relevant and important in the past when clearcutting, shelterwoods, seed tree cuts, etc. were much more common.

SNAG AND LOG HABITAT: PRIMARY CAVITY EXCAVATORS (PCES)

Background information- More than 80 species of wildlife use snags and living trees with defects (deformed limbs or bole, decay, hollow, or trees with brooms) in the interior Columbia River basin (Bull et al. 1997). The Blue Mountains of Oregon have 39 bird and 23 mammal species that use snags for nesting or shelter (Thomas 1979).

PCEs rely heavily on decadent trees, snags, and down woody material and can be used as an indicator species of snag habitat. These birds; common flicker (*Colaptes auratus*); Lewis' (*Melanerpes lewis*), hairy (*Picoides villosus*), downy (*Picoides pubescens*), white-headed (*Picoides albolarvatus*), black-backed (*Picoides arcticus*), three-toed (*Picoides tridactylus*), northern three-toed (*Picoides tridactylus bacatus*), and pileated (*Dryocopus pileatus*) woodpeckers; yellow-bellied (*Sphyrapicus varius*) and Williamson's sapsuckers (*Sphyrapicus thyroideus*); black-capped (*Parus atricapillus*), chestnut-backed (*Poecile rufescens*), and mountain chickadees (*Poecile gambeli*); and white-breasted (*Sitta carolinensis*), red-breasted (*Sitta Canadensis*), and pygmy (*Sitta pygmaea*) nuthatches, depend on snags for nesting and roosting, and snags and down wood for foraging. A key assumption is if habitat is provided for PCEs, then habitat requirements for secondary cavity users will be met. Suitable nest sites are often considered the limiting factor for cavity nesting bird populations. Habitat for the white-headed woodpecker, and other species such as western bluebirds, was once quite common on the east side of the Cascade Mountains, but years of fire exclusion, along with selectively harvesting large old pine trees has greatly reduced this habitat to well below historic levels.

Thinning and prescribed burning may be needed to restore habitat and increase bird numbers. In one study, white-headed woodpeckers were not observed in any untreated forest stands during 3 years of monitoring (Okanogan and Wenatchee National Forests, Cascade Lookout newsletter 2006). These same treatments are also successful in reducing the risk of high severity fire in these stands. Many PCEs, and secondary cavity nesters, feed on forest insects and play a vital role in maintaining healthy, productive forests. Large snags and trees provide more functions, for more species, for a greater period of time than smaller ones. Large woody structures are not easily or quickly replaced. Down woody material is an important component of the forest ecosystem because of its role in nutrient cycling and immobilization, soil productivity, and water retention (Johnson and O'Neil 2001). It also provides habitat for mycorrhyzal fungi, invertebrates, reptiles, amphibians, and small mammals. For these reasons emphasis should be

placed on conserving or creating these structures when carrying out forest management practices. There is increasing pressure on snag and log habitat as logging safety restrictions and firewood gathering intensify.

LRMP standards- LRMP direction is to maintain snags and green tree replacement trees of ≥21 in dbh, or whatever is the representative diameter of the overstory layer if it is <21 in dbh, at 100% potential population levels of primary cavity excavators (U.S. Forest Service 1995). The LRMP used information from Wildlife Habitats in Managed Forests (Thomas et al. 1979; at least 2.25 snags >20 in dbh per acre) to establish minimum snag guidelines. The model Thomas et al. (1979) used to generate snag densities addressed snags for roosting and nesting, but did not consider snags for foraging, and was never scientifically validated. More recently, several studies have shown these snag densities are too low to meet the needs of many primary and secondary cavity users (Bull et al. 1997, Harrod et al. 1998, Korol et al. 2002). Consequently, the original standards for snags and down wood from Thomas et al. (1979) were replaced with the Regional Forester's Forest Plan Amendment #2 (U.S. Forest Service 1995). Bull et al. (1997) found the 2.25 snags/acre insufficient and that 4 snags/acre (2.8 are between 10-20 in dbh and 1.2 are >20 in dbh) is more appropriate as a minimum density required by primary and secondary cavity users for roosting, nesting, and foraging needs. Harrod et al. (1998) determined a range of historic snag densities for dry eastside forests between 5.9-14.1 snags/acre (5-12 are between 10-20 in dbh and 0.9 to 2.1 are >20 inches dbh). Korol et al. (2002) determined that HRV for large snags (20" dbh) for dry eastside mixed conifer forest with a low intensity fire regime was 2.9 to 5.4 snags/acre.

Direction from the Regional Forester's Forest Plan Amendment No. 1 requires that pre-activity levels of logs be left unless those levels exceed those shown in Table 5. Live green trees of adequate size must also be retained to provide replacements for snags and logs through time. Generally green tree replacements (GTRs) need to be retained at a rate of 25 to 45 trees per acre, depending on biophysical group. Pre-activity levels of logs should also be left unless levels exceed amounts specified in Amendment #2 (U.S. Forest Service 1995; Table 5). Larger blowdowns with intact tops and root wads are preferred to shorter sections of tree boles.

Table 5. LRMP standards for down wood[1]

Stand type	Pieces/acre[1]	Piece length	Diameter small end	Linear ft/acre
Ponderosa Pine	3-6	> 6`	12``	40`
Mixed conifer	15-20	> 6`	12``	140`
Lodgepole Pine	15-20	> 8`	8``	260`

[1] The table converts to about 0.4, 1.7, and 3.3 tons/acre for ponderosa pine, mixed conifer, and lodgepole pine,

EXISTING CONDITIONS

Based on field reconnaissance (summer/fall 2014), down wood in all size classes (0 - 0.25 in, 0.25 - 1 in, and > 3 in) is common throughout the project area and the Wolf Creek/Poder River and North Powder River watersheds, indicating the total volume of down wood exceeds LRMP

standards. Within the watershed the cold upland forest types contain (< 30 tons/acre fuel loads), the dry upland forest types contain (< 20 tons/acre fuel loads), and the moist upland forest types contain (>30 tons/acre fuel loads).

Stand exams of proposed units found snag levels were found to be generally between 3-7 snags per acres (10-21 + inch diameter and >20 ft tall), dependent on stand composition. Although past logging has reduced snags in past regeneration harvest units, other areas (especially lodgepole and grand fir dominated stands) show an increase in snags due to past insect and disease outbreaks. The majority of snags found in lodgepole stands are >12 in dbh.

THE DECAYED WOOD ADVISOR (DECAID)- The DecAID advisor (Mellen et al. 2006) and "Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications" currently provide the most current, peer-reviewed science available for assessing snag habitat. DecAID is an internet-based computer program developed as a tool to help federal land managers evaluate effects of management activities on wildlife species that use dead wood habitats, and is used primarily to compare existing and projected snag levels to wildlife use levels. GNN (Gradient Nearest Neighbor) data can give an idea of current snag levels within the analysis area and validate field reconnaissance. Comparing this data with stand exams conducted in stands with no evidence of previous harvest can give an idea of what the current vs. historical conditions for the area are.

A "qualitative assessment" is the level of DecAID analysis that is used based on the fact that all existing snags $\geq$ 12 in dbh would be retained in all harvest units. Cursory snag and down wood data were collected during field reconnaissance for this project. Recent, local research has been done on Pileated Woodpecker (*Dryocopus pileatus*), Black-backed Woodpecker (*Picoides arcticus*), Williamson's Sapsucker (*Sphyrapicus thyroideus*), Pygmy Nuthatch (*Sitta pygmaea*) and White-breasted nuthatch (*Sitta caroliensis*) by Bull and Nielsen-Pincus (2007) which has been incorporated into DecAID.

The habitat categories from DecAID that most closely reflect conditions in the Limber Jim/Muir area are the "Small/medium tree" structural conditions within the "Eastside Mixed Conifer Forests, East Cascades/Blue Mountains" DecAID synthesized data for wildlife use of snag densities, by a representative sample of PCEs possibly found within the analysis area, are given below (Table 6). Effects are discussed in terms of snag densities with and without the proposed treatments, and how those densities relate to tolerance levels for wildlife species that utilize snags. The information is presented at three statistical tolerance levels which may be interpreted as three levels of "assurance": low (30% TL), moderate (50% TL) and high (80% TL). Each tolerance level is the amount of assurance a land manager would have that they are meeting the habitat needs of the specific species (e.g., 0.3 snags per acre <10 inches dbh would provide a 30% assurance of meeting habitat needs for white headed woodpeckers).

Table 6. DecAID synthesized data for wildlife use of snag densities for Eastside Mixed Conifer Forests, East Cascades/Blue Mountains and small/medium trees and larger trees structural condition classes (EMC_ECB_S).

Species	Snags > 10 in dbh		
	30% TL[1] Snag density (#/acre)	50% TL Snag density (#/acre)	80% TL Snag density (#/acre)
White-headed woodpecker	0.3	1.7	3.7
Pygmy nuthatch	1.1	5.6	12.1
Black-backed woodpecker	2.5	13.6	29.2
Williamson's sapsucker	14.0	28.4	49.7
Pileated woodpecker	14.9	30.1	49.3

[1] TL = Tolerance level.

Existing snag densities (< 20in dbh) were compared to wildlife tolerance levels (Table 8) to come up with an estimate of the percent of the watershed that can provide all aspects of habitat (roosting, nesting, foraging) for the identified PCE's (Table 7).

Table 7. Percent of landscape available as habitat based on snag density data

Species	30% TL	50% TL	80% TL
White-headed woodpecker	67%	67%	67%
Pygmy nuthatch	67%	42%	27%
Black-backed woodpecker	67%	27%	5%
Williamson's sapsucker	22%	5%	2%
Pileated woodpecker	22%	5%	2%

The studies used in DecAID to derive this data are largely from NE Oregon and are applicable to the project area. Based solely on snag density, all species are supported at the 30%, 50% and 80% TL. Habitat availability declines sharply for the Williamsons's sapsucker and Pileated woodpecker at the 50% and 80% TL. At those tolerance levels, Wiliamson's sapsuckers and pileated woodpeckers can be assumed to not use the majority of the project area for nesting, roosting, or foraging. These birds need areas with snag densities much higher than those in the project area. However, these assumptions are derived solely from snag density and do not take in the full picture of the surrounding forest. Black-backed woodpeckers thrive in areas where snags are created through intense fire and so while snag densities capable of supporting black-backed woodpeckers might exist, the area still might not be viable for them. Historically, white-headed woodpeckers probably used most of the lower elevation areas within the analysis area. Source habitats for low-elevation old-forest species have declined more than any other habitat type from historical to current conditions and populations of white-headed woodpeckers have declined strongly along with this loss of habitat (Wisdom et al. 2000).

Retention of downed logs is based on Amendment #2. DecAID provides estimates of percent cover of downed wood. The existing down wood data is in tons per acre. A direct conversion to percent cover tolerance levels is not possible without the length of the logs and diameter, and this data is not available. However, estimates of post project down wood exceed LRMP standards.

MIGRATORY BIRD SPECIES

Background Information- A migratory bird is defined by the Migratory Bird Treaty Act of 1918 as any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. They are a large group of species, including many hawks (*Buteo sp.*), shorebirds (*Charadriiformes*), flycatchers (*Muscicapidae sp*), vireos (*Vireonidae sp.*), swallows (*Hirundinidae sp.*), thrushes (*Turdidae sp.*), warblers (*Parulidae sp.*), and hummingbirds (*Trochilidae sp.*), with diverse habitat needs spanning nearly all successional stages of most plant community types. Nationwide declines in population trends for migratory species, especially neotropical species, have developed into an international concern. Recent analyses of local and regional bird population counts, radar migration data, and capture data from banding stations show that forest-dwelling bird species, have experienced population declines in many areas of North America (Finch 1991). Habitat loss is considered the primary reason for declines. Other contributing factors include fragmentation of breeding grounds, deforestation of wintering habitat, and pesticide poisoning.

The U.S. Fish and Wildlife Service (FWS) is the lead federal agency for managing and conserving migratory birds in the United States; however under Executive Order (EO) 13186 all other federal agencies are charged with the conservation and protection of migratory birds. In response to this, the Forest Service has implemented management guidelines that require the Forest Service to address the conservation of migratory bird habitat and populations when developing, amending, or revising management plans (Executive Order 13186, 2001). To aid in this effort, the USFWS published *Birds of Conservation Concern 2008* (*BCC 2008*). The overall goal of the report is to accurately identify the migratory (and non-migratory) bird species that represent the high conservation priorities. BCC 2008 uses current conservation assessment scores from three bird conservation plans: Partners in Flight North American Landbird Conservation Plan (PIF; Rich et al. 2004), the United States Shorebird Conservation Plan (USSCP; Brown et al. 2001, USSCP 2004), and the North American Waterbird Conservation Plan (NAWCP, Kushlan et al. 2002).

Bird Conservation Regions (BCRs) are used to separate ecologically distinct regions in North American with similar bird communities, habitats, and resource management issues. Species contained within the BCC are identified for each BCR. The La Grande District and majority of the Wallowa-Whitman NF is found within BCR-10, Northern Rockies.

EXISTING CONDITIONS

BCR-10 includes the Northern Rocky Mountains and outlying ranges in both the United States and Canada, and also the intermontane Wyoming Basin and Fraser Basin. The Rockies are dominated by a variety of coniferous forest habitats. Drier areas are dominated by ponderosa pine, with Douglas fir and lodgepole pine at higher elevations and Engleman spruce and subalpine fir even higher. More mesic forests to the north and west are dominated by eastern

larch, grand fir, western red cedar and western hemlock. 5 migratory species of conservation concern have been identified as potentially occurring within the project area (Table 8). No formal surveys have been conducted specifically for any of these species within the East Face analysis area, although terrestrial birds were monitored in the Blue Mountains from 1994-2011 as part of the U.S. Forest Service Avian Monitoring Program (Huff and Brown 2006), as well as multiple annual breeding bird survey route through the La Grande and Baker districts (Sauer et al. 2011).

Table 8. Migratory species of conservation concern identified within the East Face analysis area

Species	Habitat
Flammulated Owl (*Otus flammeolus*)	Associated with ponderosa pine forests and mixed conifer stands with a mean 67% canopy closure, open understory with dense patches of saplings or shrubs
Williamsons Sapsucker (*Sphyrapicus thyroideus*)	Occupies mature open mixed coniferous and deciduous forests at mid to high elevation. Snags are a critical habitat component.
Olive-sided Flycatcher (*Contopus cooperi*	Open conifer forests (<40% canopy cover) and edge habitats where standing snags and scattered tall trees remain after a disturbance.
Calliope Hummingbird (*Selasphorus calliope*)	Predominantly a montane species found in open shrub sapling seral stages (8- 15 years) at higher elevations and riparian areas.
Cassins Finch (*Haemorhous cassinii*)	Open, mature coniferous forests of lodgepole and ponderosa pine, aspen, alpine fir, grand fir and juniper steppe woodlands.

Literature Cited

Beckwith, R.C., Bull, E.L. 1985. Scat analysis of the arthropod component of pileated woodpecker diet. The Murrelet 66:90-92.

Bull, E.L. 1987. Ecoloy of the pileated woodpecker in northeastern Oregon. Journal of Wildlife Management 51:472-481.

Bull,E.L., Beckwith,R.C., Holthausen,R.S., 1992. Arthropod diet of pileated woodpeckers in northeastern Oregon. Northwestern Naturalist 73:42-45.

Bull, E.L., Clark, A.A., Shepherd, J.F. 2005. Short term effects of fuel reduction on pileated woodpeckers in northeastern Oregon - a pilot study. PNW-RP-564, 17p. Portland, OR, USDA Forest Service Pacific Northwest Research Station.

Bull, E.L., D.G. Parks, and T.R. Torgerson. 1997. Trees and logs important to wildlife in the interior Columbia River Basin. Gen. Tech. Rep. PNW-GTR-391. USDA, Forest Service, Pacific Northwest Research Station. Portland, OR. 55 pp.

Bull, E.L., Heater, T.W.2000. Resting and denning sites of American Martens in northeastern Oregon. Northwest Science 74:179-185.

Bull, E.L., Heater, T.W. 2001. Home range and dispersal of the American marten in northeastern Oregon. Northwestern Naturalist 82:7-11.

Bull, E.L., Hohmann, J.H., 1994. Breeding biology of northern goshawks in northeastern Oregon. Studies in Avian Biology 16:103-105.

Bull, E.L., Holthausen, R.S. 1993. Habitat use and management of pileated woodpeckers in northeastern Oregon. Journal of Wildlife Management 57:335-345.

Bull, E.L., Holthausen, R.S., Henjum, M.G. 1992. Roost trees used by pileated woodpeckers in northeastern Oregon. Journal of Wildlife Management 56:786-793.

Bull, E.L., Meslow, C.E. 1977. Habitat requirements of the pileated woodpecker in northeastern Oregon. Journal of Forestry 75:335-337.

Bull, E.L., Meslow, C.E. 1988. Breeding biology of the pileated woodpecker - management implications. PNW-RN-474. Portland, OR, USDA Forest Service Pacific Northwest Research Station.

Bull, E.L., Wales, Barbara C. 2001. Effects of disturbance on amphibians of conservation concern in eastern Oregon and Washington. Northwest Science, 75:174-179.

Bull, E. L., Nicole Neilsen-Pincus, Barbara C. Wales, and Jane L. Hayes. 2007. The influence of disturbance vents on pileated woodpeckers in Northeastern Oregon. Forest Ecology and Management 243:320-329.

Bull, E.L., Nielsen-Pincus, N., Wales, B.C., Hayes, J.L. 2007. The influence of disturbance events on pileated woodpeckers in northeastern Oregon. Forest Ecology and Management 243:320-329.

Bull, E.L., Peterson, S.R., Thomas, J.W. 1986. Resource partitioning among woodpeckers in northeastern Oregon. PNW-444. Portland, OR, USDA Forest Service Pacific Northwest Research Station.

Buskirk, S.W., Ruggiero, L.F., Aubry, K.B., Lyon, J., Zielinski,W.J. 1994.The scientific basis for conserving forest carnivores. Gen. Tech. Rep. RM-254. Ft Collins, CO, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station.

Buskirk, S.W., Zielinski, W.J. 1997. American marten (Martes americana) ecology and conservation. Pages 17-22 *in* Harris,J.E., Ogan,C.V. editors. Mesocarnivores of northern California: biology, management, and survey techniques, workshop manual. The Wildlife Society, Arcata, CA.

Cook, J.G., L.L. Irwan, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 1998. Relations of forest cover and condition of elk: a test of the thermal cover hypothesis on summer and winter. Wildlife Monographs 141: 1-61.

Cook, J.G., L.L. Irwin, L.D. Bryant, R.A. Riggs, and J.W. Thomas. 2005. Thermal cover needs of large ungulates: A review of hypothesis tests. Pages 185-196 *in* Wisdom, M.J., technical edirot. 2005a. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Alliance Communications Group. Lawrence, KS.

Corkran, C.C., and C. Thoms. 2006. Amphibians of Oregon, Washington, and British Columbia. Lone Pine Publishing, Auburn, WA.

Creel, S., J.E. Fox, A. Hardy, J. Sands, B. Garrott, and R. Peterson. 2002. Snowmobile activity and Glucocorticoids stress responses in wolves and elk. Conservation Biology 16:809-814.

Crocker-Bedford, B.C. 1990. Goshawk reproduction and forest management. Wildlife Society Bulletin, 18:262-269

Csuti, B., A.J. Kimerling, T.A. O'Neil, M.M. Shaughnessy, E.P. Gaines, J.C. Hak. 2001. Atlas of Oregon wildlife: distribution, habitat and natural history. Oregon State University Press, Corvallis, OR. 492pp.

Daw, S.K., DeStefano, S. 2001. Forest characteristics of Northern goshawk nest stands and post-fledging areas in Oregon. Journal of Wildlife Management 64:59-65.

Desimone, S.M., DeStefano, S. 2005. Temporal patterns of northern goshawk nest area occupancy and habitat: a retrospective analysis. Journal of Raptor Research 39:310-323.

Edge, W.D. 1982. Distribution, habitat use and movement of elk in relation to roads and human disturbances in western Montana. M.S. Thesis. University of Montana, Missoula, MY. 98 pp.

Finch, D.M. 1991. Population ecology, habitat requirements, and conservation of neotropical migratory birds. Gen. Tech. Rep. RM-GTR-205. USDA, Forest Service, Rocky Mountain Forest and Range Experiment Station. Fort Collins, CO. 26 pp.

Finn, S.P., Varland, D. Marzluff,J.M., 2002. Does northern goshawk breeding occupancy vary with nest-stand characteristics on the olympic peninsula, Washington? Journal of Raptor Research 36:265-279.

Graham, R.T., R.L. Rodriguez, K.M. Paulin, R.L. Player, A.P. Heap, and R. Williams. 1999. The Northern Goshawk in Utah: habitat assessment and management recommendations. USDA Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-22. 48 pp.

Harrod, R.J., W.L. Gaines, W.E. Hartl, and A. Camp. 1998. Estimating historical snag density in dry forests east of the Cascade Range. Gen. Tech. Rep. PNW-GTR-428. USDA Forest Service, Pacific Northwest Research Station. Portland, OR. 16pp.

Hayes, J.P., E.G. Horvath, P. Hounihan. 1997. Townsend's chipmunk populations in Douglas-fir plantations and mature forest in the Oregon Coast Range. Canadian Journal of Zoology, 73:67-73.

Huff, M., and M. Brown. 2006. Eight years of terrestrial bird monitoring on National Forest of the Pacific Northwest. Cooperative agreement between U.S. Fish and Wildlife Service and U.S. Forest Service's Avian monitoring program. Portland, OR. 130 pp.

Johnson, D.H., and T.A. O'Neil, Managing Directors. 2001. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis, OR. 736 pp.

Kennedy, P.L., J.M. Ward, G.A. Rinker, J.A. Gessaman. 1994. Post-fledging areas in northern goshawk home ranges. Studies in Avian Biology 16:75-82.

Korol, J.J., M.A. Hemstrom, W.J. Hann, and R. Gravenmier. 2002. Snags and down wood in the Interior Basin Ecosystem Management Project. *In* Proceedings of the symposium on the Ecology and Management of Dead Wood. Gen. Tech. Rep. PSW-GTR-181. USDA Forest Service, Pacific Southwest Research Station. 28pp.

Landres, P.B., P. Morgan, F.J. Swanson. 1999. Overview of the use of natural variability concepts in managing ecological systems. Ecological Applications 9: 1179-1188.

Leckenby, D.A. 1984. Elk use and availability of cover and forage habitat components in the Blue Mountains, northeast Oregon 1976-1982. Wildlife Research Report. 14. Portland, OR: Oregon Department of Fish and Wildlife. 40 pp.

Long, R.A., J.L. Rachlow, J.G. Kie, and M. Vavra. 2008. Fuels reduction in a western coniferous forest: effects on quantity and quality of forage for elk. Rangeland Ecology and Management. 61: 302-313.

Marshall, D.B. 1992. Status of the Northern Goshawk in Oregon and Washington. Audobon Society of Portland, Portland, OR. 35 pp.

Marshall, D.B, M.G. Hunter, A.L. Contreras, Eds. 2003. Birds of Oregon: A general reference. Oregon State University Press, Corvallis, OR. 768 pp.

Mellen-Mclean, Kim, B.G. Marcot, J.L. Ohmann, K. Waddell, S.A. Livingston, E.A. Wilhite, B.B. Hostetler, C.Ogden, T. Dreisbach. 2009. DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. Version 2.1. USDA Forest Service, Pacific Northwest Region and Pacific Northwest Research Station; USDI Fish and Wildlife Service, Oregon State Office; Portland, Oregon. http://www.fs.fed.us/r6/nr/wildlife/decaid/index.shtml.

McGrath, M.T., DeStefano, S., Riggs, R.A., Irwin, L.L., Roloff, G.J. 2003. Spatially explicit influences on Northern goshawk nesting habitat in the interior pacific northwest. Wildlife Monographs 154:1-63.

NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer

Powell, David C. 2010. Range of variation recommendations for dry, moist, and cold forests. Rep # F14-SO-WP-Silv-03. USDA Forest Service. Pendleton, OR.

Powell, R.A. 1994. Structure and spacing of *Martes* populations. In: Buskirk, S.W., A.S. Harestad, M.G. Raphael, and R.A. Powell, editors. Martens, sables, and fishers: biology and conservation. Ithaca, NY: Cornell University Press. P101-121.

Peninger, M., K. Keown. 2011 Amerian Marten Management Indicator Species Assessment. USDA Forest Service. Wallowa-Whitman National Forest - DRAFT.

Peninger, M., K. Keown. 2011 Northern Goshawk Management Indicator Species Assessment. USDA Forest Service. Wallowa-Whitman National Forest - DRAFT.

Penninger, M., K. Keown. 2011. Pileated Woodpecker Management Indicator Species Assessment. USDA Forest Service. Wallowa-Whitman National Forest - DRAFT.

Reynolds, R.T., Meslow, E.C., Wright, H.M. 1982. Nesting habitat of coexisting accipiter in Oregon. Journal of Wildlife Management 46:124-138.

Reynolds, R.T. 1983. Management of western coniferous forest habitat for nesting accipiter hawks. GTR-RM-102. Fort Collins, CO, USDA Forest Service Rocky Mountain Forest and Range Experiment Station.

Reynolds, R.T., Graham, R.T., Reiser, M.H., Bassett, R.L., Kennedy, P.L., Boyce, D.A., Goodwin, G., Smith, R., Fisher, E.L. 1992. Management recommendations for the northern goshawk in the southwestern United States. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, GTR-RM-217.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, and M.S.W. Bradstreet. 2004. Partners in Flight North American landbird conservation plan. Cornell Laboratory of Ornithology. Ithaca, NY. 84 pp.

Rohner, C., Doyle, F.I. 1992. Food stressed great horned owl kills adult goshawk: exceptional observation or community process? Journal of Raptor Research 26:261-263.

Rowland, M.M., M.J. Wisdom, B.K. Johnson, and M.A. Penninger. 2005. Effects of roads on elk: Implications for management in forested ecosystems. Pages 42-52 *in* Wisdom, M.J., technical editor. 2005a. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Alliance Communications Group. Lawrence, KS.

Squires, J.R. 2000. Food habits of Northern goshawks nesting in south central Wyoming. The Wilson Bulletin536-539.

Squires, J.R., Kennedy, P.L. 2006. Northern goshawk ecology; an assassment of current knowledge and information needs for conservation and management. Studies in Avian Biology 31:8-62.

Thomas, J.W. 1979. Wildlife habitats in managed forests: The Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553. USDA Forest Service. Washington D.C. 512 pp.

Thomas, J.W., D.A. Leckenby, M. Henjum, R.J. Pedersen, and L.D. Bryant. 1988. Habitat effectiveness index for elk on blue mountain winter ranges. U.S. Department of Agriculture, Forest Service, PNW-GTR-128, Portland, OR. 28 pp.

Torgersen, T.R., Bull, E.L. 1995. Down logs as habitat for forest dwelling ants - the primary prey of pileated woodpeckers in northeastern Oregon. Northwest Science 69:294-302.

Toweill, D.E., and J.W. Thomas. 2002. North American Elk: Ecology and Management. The Wildlife Management Institute. Washington D.C. 962 pp.

U.S.Forest Service. Land and Resource Management Plan Wallowa-Whitman National Forest. USDA, Forest Service. 1990. Pacific Northwest Region (R6), Wallowa-Whitman National Forest.

U.S.Forest Service. Regional Forester's Forest Plan Amendment #2. PACFISH/INFISH/SCREENS Information Guide. 1995. Pacific Northwest Region (6), Wallowa-Whitman National Forest, USDA Forest Service.

Wisdom, M.J., technical editor. 2005a. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Alliance Communications Group. Lawrence, KS.

Wisdom, M.J., B.K. Johnson, M.Vavra, J.M. Boyd, P.K. Coe, J.G. Kie, A.A. Ager, and N.J. Cimon. 2005b. Cattle and elk responses to intensive timber harvest. Pages 197-216 *in* Wisdom, M.J., technical editor. 2005b. The Starkey Project: a synthesis of long-term studies of elk and mule deer. Alliance Communications Group. Lawrence, KS.

Wisdom, M.J., Holthausen, R.S., Wales, B.C., Hargis,C.D., Saab, V.A., Lee, D.C., Hann, W.J., Rich, T.D., Rowland, M.M., Murphy, W.J., Eames, M.R. 2000. Source habitat for terrestrial vertebrates of focus in the interior Columbia Basin: Broad-scale trends and management implications. Quigley, Thomas M. PNW-GTR-485. Portland, OR, USDA Forest Service Pacific Northwest Research Station.

Witmer,G.W., Martin,S.K., Sayler,R.D.1998. Forest carnivore conservation and management in the interior Columbia Basin : Issues and environmental correlates. Gen. Tech. Rep. GTR-PNW-420, 51 p. Portland, OR, USDA Forest Service, Pacific Northwest Research Station.

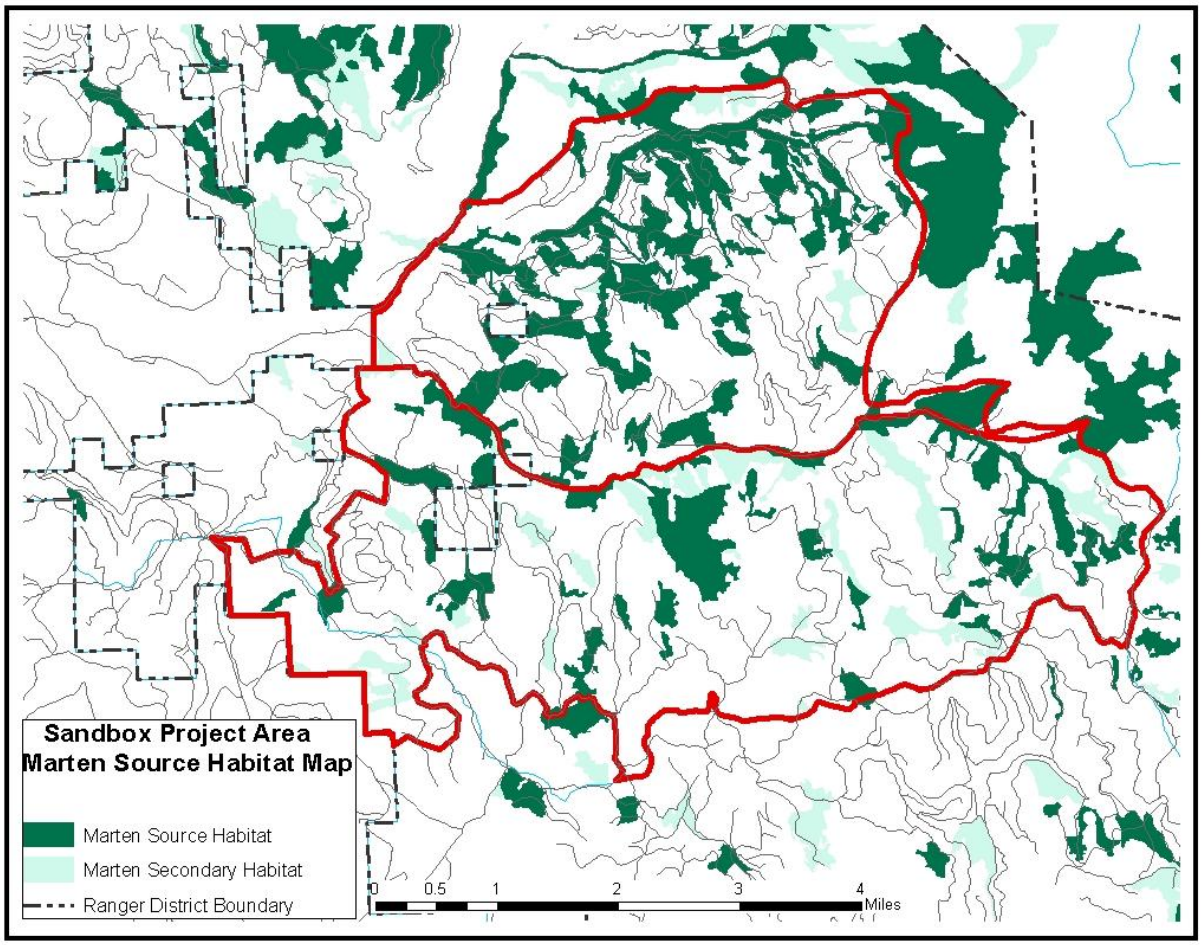

Image 1. Marten (*Martes americana*) Source Habitat Map – Sandbox Project Area

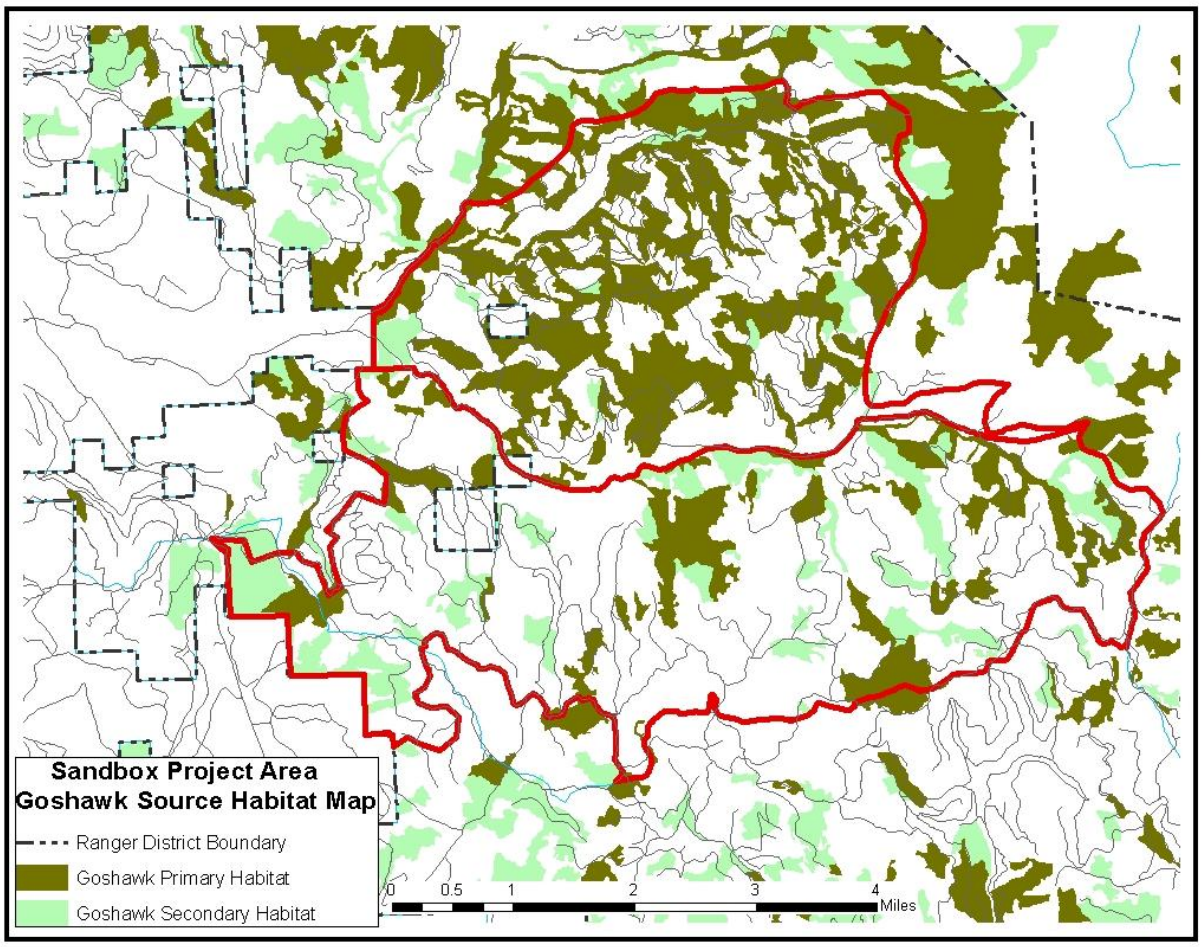

Image 2. Goshawk (*Accipiter gentilis*) Source Habitat Map – Sandbox Project Area

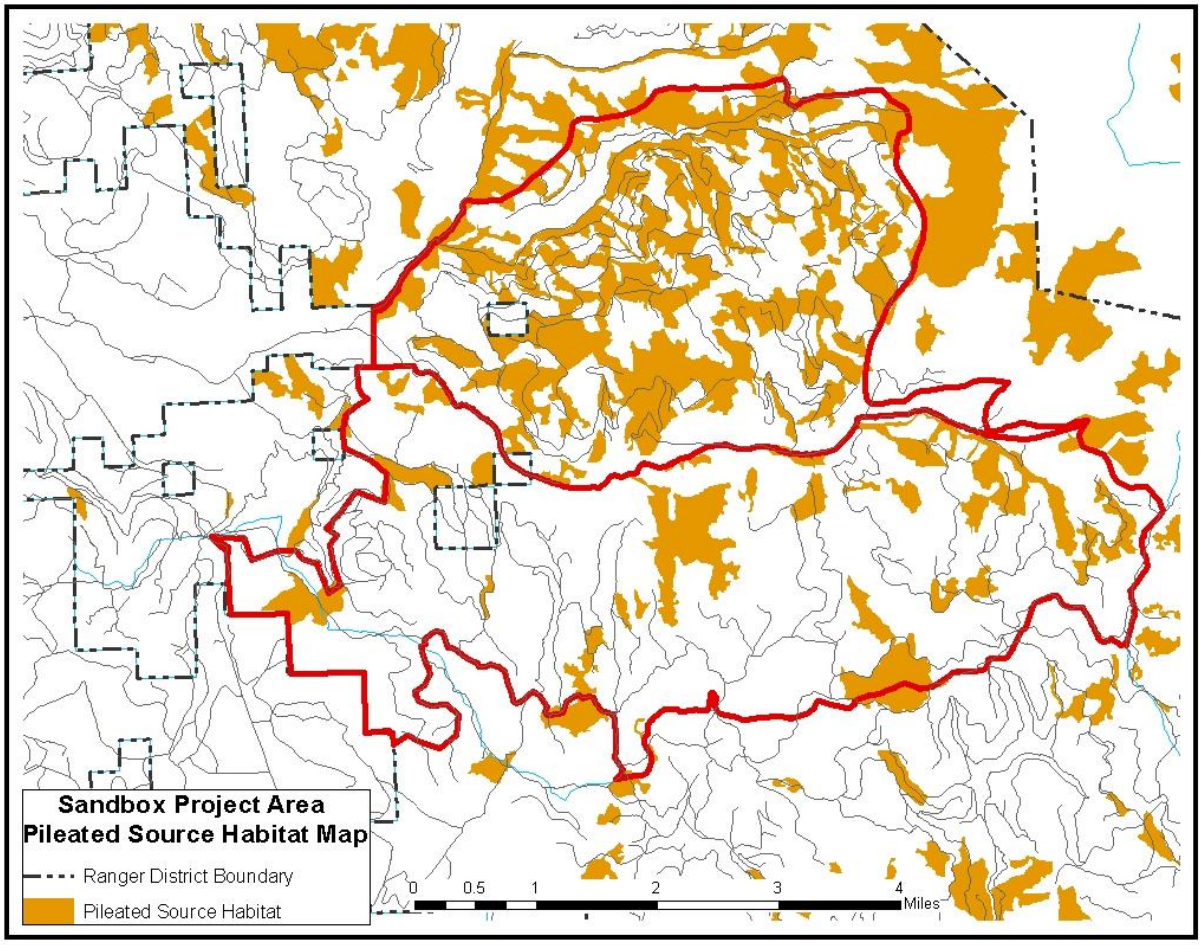

Image 3. Pileated Woodpecker (*Dryocopus pileatus*) Source Habitat Map – Sandbox Project Area

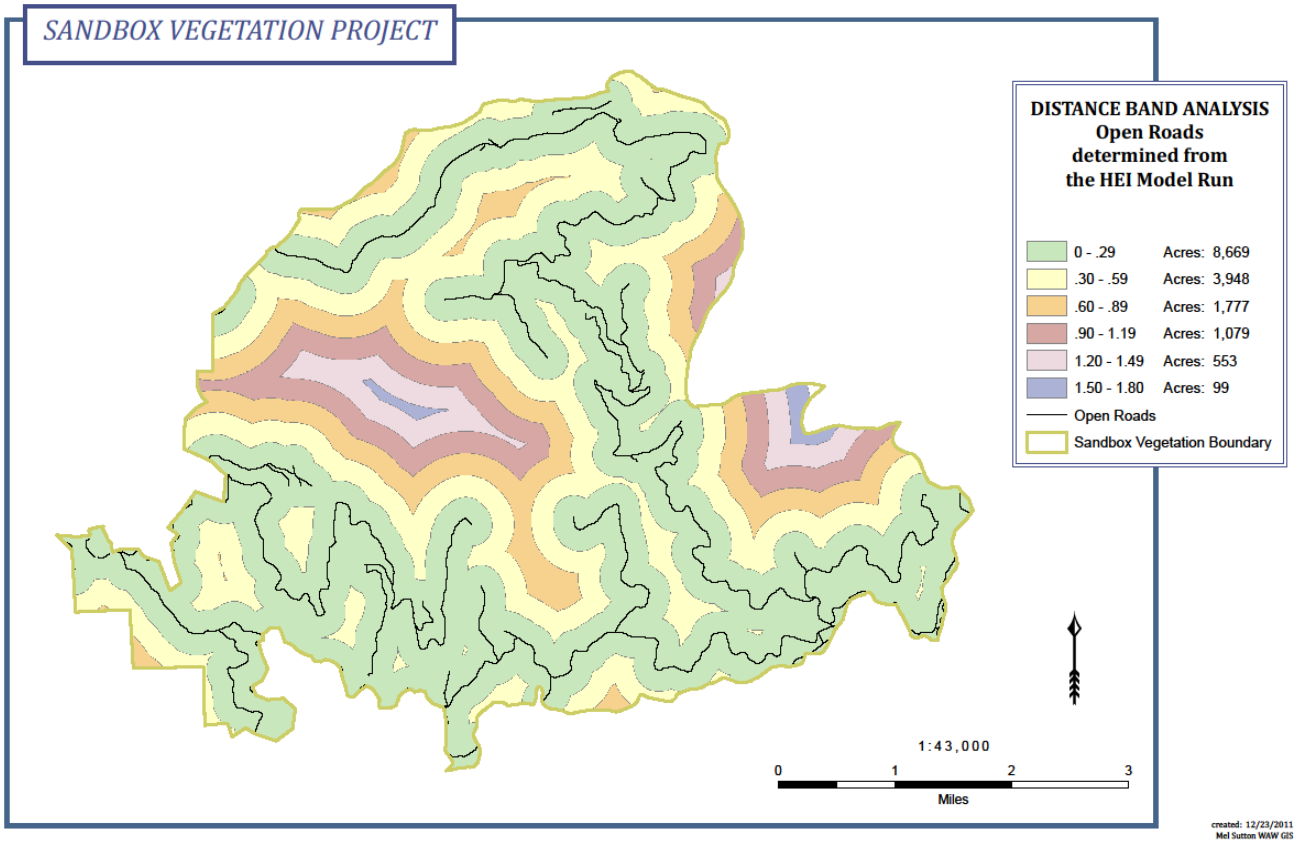

Image 4. Distance band analysis- Sandbox project area